CLAIMS

1. An electrolyte sheet for solid oxide fuel cells comprising a sintered sheet, wherein surface roughness of the sheet as measured by an optical and laser-based non-contact three-dimensional profile measuring system is 2.0 to 20 μm in Rz and 0.20 to 3.0 μm in Ra on both surfaces of the sheet, and wherein a ratio of Rz of one surface (having a greater Rz) to Rz of the other surface having a smaller Rz of the sheet (Rz ratio) is in a range of 1.0 to 3.0 and a ratio of Rmax to Rz (Rmax/Rz ratio) of at least one surface is in a range of 1.0 to 2.0, and wherein Rz (mean roughness depth), Ra (arithmetical mean roughness value), and Rmax (maximum roughness depth) are roughness parameters as determined according to German Standard "DIN-4768" and are numerical values as measured for each surface of the sheet.

2. An electrolyte sheet for solid oxide fuel cells comprising a sintered sheet, wherein surface roughness of the sheet as measured by an optical and laser-based non-contact three-dimensional profile measuring system is 2.0 to 20 μm in Rz and 0.20 to 3.0 μm in Ra on both surfaces, and wherein a ratio of Ra of one surface (having a greater Ra) to Ra of the other surface having a smaller Ra of the sheet (Ra ratio) is in a range of 1.0 to 3.0

and a ratio of Rmax to Rz (Rmax/Rz ratio) of at least one surface is in a range of 1.0 to 2.0, and wherein Rz (mean roughness depth), Ra (arithmetical mean roughness value), and Rmax (maximum roughness depth) are roughness parameters as determined according to German Standard "DIN-4768" and are numerical values as measured for each surface of the sheet.

3. An electrolyte sheet for solid oxide fuel cells comprising a sintered sheet, wherein surface roughness of the sheet as measured by an optical and laser-based non-contact three-dimensional profile measuring system is 2.0 to 20 μm in Rz and 0.20 to 3.0 μm in Ra, and wherein a ratio of Rz of one surface (having a greater Rz and a greater Ra) to Rz of the other surface having a smaller Rz and a smaller Ra (Rz ratio) is in a range of 1.0 to 3.0, and a ratio of Ra of one surface (having a greater Rz and a greater Ra) to Ra of the other surface having a smaller Rz and a smaller Ra (Ra ratio) is in a range of 1.0 to 3.0, and a ratio of Rmax to Rz (Rmax/Rz ratio) of at least one surface is in a range of 1.0 to 2.0, and wherein Rz (mean roughness depth), Ra (arithmetical mean roughness value), and Rmax (maximum roughness depth) are roughness parameters as determined according to German Standard "DIN-4768" and are numerical values as measured for each surface of the sheet.

4. The electrolyte sheet for solid oxide fuel cells according to any of claims 1 to 3, wherein the Rmax/Rz ratio is greater than 1.0 and not greater than 1.3.

5. A process for production of an electrolyte sheet for solid oxide fuel cells according to any of claims 1 to 4, comprising steps of: preparing a slurry for production of a green sheet, wherein particle size of solid components in the slurry is 0.2 to 0.8 μm in 50 vol.% diameter and 0.8 to 10 μm in 90 vol.% diameter, and wherein particle size distribution has each one peak in a range of 0.2 to 0.8 μm and in a range of 0.8 to 10 μm; preparing a green sheet, using the slurry, on a polymer film with surface roughness being in a range of 3 to 30 μm in Rz and in a range of 0.3 to 5 μm in Ra on a surface to be coated; and calcining the green sheet.

6. The production process according to claim 5, wherein the slurry for production of a green sheet is prepared by milling raw material powder (A) of 0.2 to 0.8 μm in 50 vol.% diameter and of 0.8 to 10 μm in 90 vol.% diameter, a binder, a dispersant, and a solvent, to give a slurry, to which is then added raw material powder (B) of 0.2 to 2 μm in 50 vol.% diameter and of 0.8 to 20 μm in 90 vol.% diameter at a ratio of 1% to

30% by mass, based on the total raw material powder mass, and by further milling the slurry so that a ratio (T_B/T_A) of a milling time (T_B) after addition of the raw material powder (B) to a milling time (T_A) only for the raw material powder (A) is adjusted in a range of 1/100 to 1/2.

7. The production process according to claim 5 or 6, wherein the green sheet is cut into a prescribed shape, and the cut green sheets are stacked up, while at least one selected from the group consisting of porous ceramic sheets, precursor green sheets of the porous ceramic sheets, and ceramic particles is placed as a spacer between the respective cut green sheets, which are then calcined.